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SCOLYTUS RUGULOSUS IN BRANCHES OF PEAR TREES WHICH WERE KILLED BY PEAR-BLIGHT.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

During the years 1882-4, large branches of young pear trees in Cambridge, Mass., were killed by pear-blight. The next year other branches were affected and killed, and finally the whole tree succumbed. All trees had been in good and healthy condition. The branches were more or less densely covered by a Coccid, determined by Prof. J. H. Comstock as *Chionaspis furfurus* (A. Fitch), described and figured in his Report for 1880, p. 315, pl. 17, f. 1. The Professor thinks it much more probable that the branches were killed by the Scolytid (directly to be mentioned) than by the Coccids, and I believe this opinion is justified by the fact that other pear trees and apple trees near by are also covered by the same Coccid and are nevertheless in a healthy condition.

The branches were densely inhabited by a *Scolytus*, which Dr. G. H. Horn determined as *Scolytus rugulosus* Ratzeburg. I was able to compare the beetle with specimens from Germany, which proved to be identical. The species was first mentioned by Dr. J. L. LeConte as introduced from Europe into the U. S., Proc. Amer. Philos. Soc., vol. xvii., p. 626, No. 79. The specimens were received from Elmira, N. Y., attacking peach trees. His collection contains, besides those from Elmira, N. Y., several specimens from Hillsboro, Md. Prof. Chas. V. Riley informs me that he has ready for publication an extended article, with illustrations, upon *S. rugulosus*, and drew my attention to his note in the N. Amer. Entom., 1880, vol. iii., p. 298. The beetles were sent by Mr. J. L. Bennett, Red Bank, N. J. They had for several years destroyed all cherry, peach and plum trees set out on a particular lot at Fair Haven. They did not appear to injure seed fruit as yet, and are confined to a small section. They bore little holes in the trees, which holes fill with gum, and the tree soon dies. Mr. H. Boyè, Coopersburg, Pa., communicated that the same beetle had so profusely stung a young cherry tree, trunk and branches, that it will not recover. Prof. Riley has received it from Hills-

boro, Md., and from Williamsport, Md., where it attacked the peach, and from the District of Columbia. As far as known to me, the N. American literature contains nothing more concerning this beetle.

In Europe the beetle is first quoted by F. Sturm (Catalog. meiner Insecten Sammlung, 1826, p. 194), with the manuscript name, *Scolytus haemorrhous* Megerle. In V. Kollar (Naturgeschichte der schaedl. Insecten, 1837, p. 270, and English transl. p. 263) the co-editor, J. Schmidberger, gives about the best account in existence of the beetle and its habits, with the same name, *S. haemorrhous*. Professor Ratzeburg, 1837, Forstinsecten, vol. i., p. 187, and Ed. ii., 1839, p. 230, gives in a note a description with the name *Eccoptyogaster rugulosus* Koch, and quotes as synonym, *Scolytus haemorrhous* Ulrich. A good figure of the beetle is given pl. x., f. 10, and of the cradle and galleries in the bark, pl. 17, f. 4. The name Ulrich is explained by Schmidberger's statement that the beetle had been determined for him by Mr. Ulrich as *S. haemorrhous* Megerle, and the article begins with this full name of the beetle. The name Koch, used by Ratzeburg, is a manuscript name. Mr. Koch, probably a student of the Professor, has nothing published. Nevertheless the beetle has been often quoted as *S. rugulosus* Koch, and only in later years as *S. rugulosus* Ratzeb. I do not understand why Ratzeburg has not adopted Schmidberger's name. That he has known this publication (though of the same year) is proved by the quotation of Ulrich's name. I am not able to see Schmidberger's work (Beitraege zur Obstbaumzucht und zur Naturgeschichte der—schaedlichen Insecten, 1827 to 1836), which probably contains the same statements as in 1837. The description by Ratzeburg without the figures would not allow a surer determination than those of Schmidberger, who gives besides a full history of the life and habits of the beetle. During the following time the literature on *S. rugulosus* is large. I have compared Noerdlinger, Letzner, Chapnis, Eichoff, Chapmann, Schmidt-goebel, for the observations on its habits. It attacks the branches, and often mere twigs, of living trees belonging to the genera *Pyrus* and *Prunus*, in great numbers, so that the infested part of the tree must perish, because it cannot continue to grow with injured bark and strongly pierced sap-wood. It appears to multiply very fast, and a double brood is supposed to occur. A few females laid so many eggs that the larvæ produced from them destroyed the bark of the stem, nearly a foot long. They cannot easily be eradicated, or at least diminished in numbers, but by removing and burning the trees attacked by them.

As I believe it to be unfair to anticipate knowingly a communication which is near its publication, I would only give a short notice of some facts which may perhaps serve Prof. Riley in bringing to the front, at least for the cases observed by me, the connection of pear-blight with this beetle. The twigs were attacked about two feet above their origin out of the trunk, where they are about two inches thick, and higher up to half an inch thickness. The next year, if the dead branch is not removed, the beetle goes further down. The cradle is perpendicular in most cases, except where it begins just below the base of a bud, and is about an inch long. The galleries are to four inches long, and rather deeply injuring the sap-wood. The hole for the pupa goes deeply, to 4 millim., in the wood. I have observed the beetle only in pear trees, but I possess it from Europe on *Prunus domestica*.

I know Mr. F. J. Burrill's papers in Proc. A. Ass. 1880, p. 583, and Amer. Nat. 1881, vol. xv., p. 527. I failed in trying to repeat his observations, what I consider of no importance against Mr. Burrill's conclusions, as just such observations need a trained skill not at my command. But I know that other scientists perfectly trained for such observations have also failed. As bacteria are everywhere to be found, we will have to wait for other reaffirming observations before we are able to accept Mr. Burrill's views. I should add that I am acquainted with the older literature on pear-blight, and with the different hypotheses about its causes.

HISTORY OF THE PREPARATORY STAGES OF PHYCIODES PICTA, Edw.

BY W. H. EDWARDS, COALBURGH, W. VA.

EGG.—Sub-conic, truncated, the top convex, the upper part from one fourth to one third the length marked by low vertical ribs, about 24 in number; below these the surface is shallowly and irregularly indented; top similarly indented, convex; color when laid yellow green. Duration of this stage about five days.

YOUNG LARVA.—Length .04 inch at 12 hours from egg, cylindrical, each segment a little rounded; color yellow-green; a few long black hairs spring from minute black tubercles; these are in longitudinal rows, two being dorsal, and two sub-dorsal (one on either side); these rows run

from 5 to 13 inclusive, the dorsals placed on the front of each segment, the sub-dorsals on the posterior part, and all are turned forward except on 11, 12, 13; between these rows on either side from 4 to 12 is a very short hair on the posterior end of each segment; the number and arrangement of hairs on 2 to 4 is different from that of the succeeding segments; 2 has a chitinous dorsal patch, long oval, on the front of which are six long hairs bent over the head, and on the rear are four straight short hairs turned back; below are four short hairs to foot, one above, one below spiracle in vertical line, and two near together before the spiracle; 3, 4, 12 have each a straight cross line of long hairs, four on either side the dorsal line and down to middle of side, part of these being in the dorsal rows before spoken of; below spiracles on 5 to 12 are two short hairs to each segment, the posterior one always a little higher than the other; and a row of short hairs along base, one to each segment from 2 to 13; head sub-globose, rather broader than high, slightly depressed at top, the vertices rounded; color black, smooth; with a few short fine hairs. To first moult about five days.

After First Moulting.—Length .13 inch at 12 hours from moult; color all dull yellow-green, with a brown band on upper part of side from 2 to 12; armed with longitudinal rows of spines, of which seven are large, one dorsal and three on either side, besides a row along base of much smaller size—in all nine rows; these spines are concolored with the body, long, slender, tapering, thickly beset with short hairs, the whole forming a dense covering; on 2 is a chitinous dorsal patch from which spring many black hairs, the front ones long and falling over the head; under side, feet and legs yellow-green; head obovoid, the top considerably depressed, the vertices rounded; color black, smooth, with many black hairs. Duration of this stage three days.

After Second Moulting.—Length .18 inch at 12 hours; color yellow-green; a faint brown line runs with the dorsal, and another just inside each sub-dorsal row of spines; a dark brown band on upper part of side from 2 to 12, and on this the tubercles and spines are brown; all others greenish-yellow; head as before. To next moult five and six days.

After Third Moulting.—Length .24 inch at 12 hours from moult; scarcely different from last stage described; the brown lines on dorsum more distinct; the black band as before, as are all tubercles and spines. To next moult five days.

After Fourth Moul.—Length .36 inch at 12 hours; color in June dark brown, dotted with sordid white on dorsum; in October more white on dorsum than brown, the white sordid, the brown restricted to lines or narrow stripes, one of which runs with the dorsal spines, and one just inside the base of each upper lateral row; in both a whitish stripe runs with the upper laterals, and next under that is a broad dark brown band, in the summer larva, darker or more blackish than the dorsal color; under this band, in June, is a broad brown space much dotted and mottled with whitish, and next a basal whitish stripe; in the October larva the lower part of side is sordid white, mottled with pale brown to the yellow-white basal stripe; the June larva is more brown than white, the October larva more white than brown. To next moult in June about nine days, in October thirteen days.

After Fifth Moul.—Length in July .42 inch at 12 hours; as in previous stage in same month, except that the side below the dark brown band is lighter, more white, less brown.

MATURE LARVA.—Length .6 inch; cylindrical, even, armed with seven principal rows of short stout tapering spines, one dorsal, three lateral; the five uppermost rows thickly beset with short stiff brown hairs; the lower row with fewer, and these are yellowish; besides these is a row of small, similar spines over feet and along base; in June the spines are light brown, or yellow-brown in the five uppermost rows, the others yellowish; in October the spines of all the rows are yellow-green, from yellow bases; color of dorsum in June brown dotted with whitish; a narrow whitish stripe runs with the upper lateral spines; next under this and extending to the lower edge of middle lateral row is a dark brown band, a little dotted with whitish, from this to the whitish basal stripe the side is pale brown, dotted and mottled with whitish; in October the dorsum is yellow-white, with three pale brown stripes, one mid-dorsal, one just inside each upper lateral row of spines; the band as in June, but chocolate-brown; the lower part of side nearly white, the two or three anterior segments mottled with pale brown; on 2 is a black chitinous dorsal oval patch, from the front of which black hairs bend over top of head; under side, in June, greenish-brown, in October, yellow-green; feet and pro-legs concolored with under side; head cordate, the vertices rounded, shining dark brown; most examples have a yellowish bar on each vertex from back to front; in some this is partly or altogether want-

ing; surface much covered with long bent black hairs. From last moult to pupation nine days.

CHRYsalis.—Length .36 to .4 inch; shape of *P. Tharos*; abdomen swollen, anterior parts narrow; head case transversely compressed, the top rounded, corners rounded, sides excavated; mesonotum rounded, not carinated, rather prominent, followed by a shallow depression; the wing cases slightly raised at margins; color uniform yellow-brown; or the wing cases, head and mesonotum are yellow-brown, a dark brown patch on either side of mesonotum toward the front; the abdomen mostly dark brown, mottled a little with yellow-brown; two yellow-brown sub-dorsal stripes from the length of the abdomen, and two others sub-vertical; no tubercles apparent; surface granulated. Duration of this stage about seven days.

This pretty species flies in Colorado, abundantly in the southern part; also in New Mexico and Arizona, and more or less in Nebraska. Mr. Nash obtained eggs by confining the female on Aster and also on Alfalfa. They are laid in clusters, as with the other species of this genus. I received from Mr. Nash, at Pueblo, So. Colorado, two clusters of eggs, 11th June, 1884. They began to hatch a few hours after arrival. There were about 75 eggs, in some parts three deep. On 18th came another lot of larvæ just hatched. I gave them leaves of various species of Aster. In all respects their behavior was like that of *Tharos*, and they are as hardy and as easy to rear. The first chrysalis formed 9th July, and the butterfly came from it 15th July. On 21st August I received from Mr. Nash another lot of larvæ just hatched. These passed first moult 27th, the second 30th, the third 4th Sept.; after this they eat little and I supposed would hibernate; but one passed 4th moult 27th Sept., and the rest passed same before 4th Oct. One passed the 5th moult 11th Oct. Up to this time the weather had been warm, but on 16th to 18th Oct. the nights were cold, nearly at frost, and the larvæ went into lethargy. These fall larvæ differ considerably in color from those of mid-summer, being lighter, less brown, as I have set forth in the description. On 6th June, 1884, I received one larva from Mr. Nash, which must have hibernated. It was .4 inch long, and past third moult. On 15th passed fourth moult, and 25th passed fifth moult, but died without disclosure of imago. There would seem to be two annual broods of the species at Pueblo. The female of *Picta* was described as *Canace*, Tr. A. E. Soc. 3, 206, from Arizona. The male described was taken in Nebraska by the late Mr.

James Ridings in 1864 (Proc. Ent. Soc. Phil. 4, 201). The female is larger than the male and much more inscribed on under side. This species does not seem to be seasonably dimorphic, as are *Camillus* and *Tharos*, but the early and late examples are of the same pattern of marking.

ON THE COURTSHIP OF THE SEXES IN *CE DIPODA* CAROLINA.

BY C. H. T. TOWNSEND, CONSTANTINE, MICH.

For several seasons past, along in the latter part of summer (August and September) I have noticed certain peculiar actions on the part of the large flying locust, *Cedipoda carolina* Linn. I have always suspected that these actions have something to do with the union of the sexes. In the warm parts of the days at this time of the year individuals of this species may frequently be seen rising from the ground, and, hovering several feet in the air, rapidly vibrating their wings and making a peculiar flapping or beating sound, the while keeping nearly the same relative position in space. Although my notes on this subject are rather imperfect, I think they may be of use. I can not find that the subject has ever been touched upon before; such may be the case, but I have not been able to discover record of it in any reports, periodicals or works on insects. Still these actions must have been noticed by observers, as they are of common occurrence.

On the 14th of August last, in the afternoon, I saw one of this species fly up from the dry parched grass, and remain nearly stationary about two feet in the air for some time, by means of a rapid beating of the wings. Presently it flew back to the ground. In a few minutes another one, which had witnessed the performance at a short distance, flew quickly over and alighted by the side of the performer. They ran by each other several times, occasionally touching each other, but did not make any further manifestations, and finally the last one flew away, leaving the other motionless in the withered grass. Though it is probable that the females are attracted by these performances of the males, and that the males vie with each other in their exhibitions, still I think that the two just spoken of were both males and were disposed to fight from a feeling of rivalry, the one that flew off having been beaten. On the 24th of the month I noticed

the same thing over again. An individual performed three times in succession, and then another alighted on the ground by its side; they ran by each other several times, apparently clasping, probably in conflict, for I am quite sure they were both males. At last one of them flew away, and the other soon after renewed the performing. I regret to say that I did not capture specimens to ascertain the sex; but, judging from size, I do not think I have ever seen any but the males taking active part in these aerial exhibitions. In going through with the performance they rise at first generally about three or four feet, making a light purring or beating sound, and then, rising higher, change the motion of the wings, when a curious, sharp, see sawing sound is produced. Some rise even higher than six feet in the last act; others rise only one or two feet. Of course some excel others in the beauty and ease with which they accomplish the feat; many do not remain in just the same place while hovering, but vary, falling or jerking about while endeavoring to keep the same point in the air. I am of the opinion that the females are sensitive to the grace with which this is performed.

THE CROTON BUG IN QUEBEC PROVINCE.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

One morning last November I went to the Chaudiere Curve, to meet the train from Halifax, which had been delayed for some hours. I found two men in the waiting-room who had spent the night there. They complained that swarms of black beetles had troubled them all night so that they could not sleep. Upon my questioning the correctness of the statement, they said, "Well, here they are in all the cracks," and they forthwith commenced to poke the creatures out. The insects were numerous enough, but they were not beetles, nor were they black. They were specimens of the German Cockroach, *Ectobia Germanica*. I afterwards enquired of one of the railway employes as to the time of the first appearance of the insects. The man told me that he first noticed them in 1882. I asked if they had appeared anywhere else in the neighborhood. "Yes," he answered, "in my own house last winter; but," he added, "I am not there in the day time, so I left the windows open and froze them out."

The enquiry is interesting, How did *Ectobia Germanica* get to the Chaudiere? At that place, which is nine miles from Point Levi,

luggage is transferred from the Grand Trunk to the Intercolonial, and *vice versa*; and the creatures might have been brought by American tourists from Boston (where it abounds), or by immigrants from Germany, or other parts of Europe. The latter supposition is the more likely, inasmuch as the immigrants far exceed the tourists in number, and also are of a different class—a class less likely to be careful as to their properties and equipments. No doubt the “bug” was carried to Boston by immigrants. It is not a “Yankee invention.”

MEETING OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCE- MENT OF SCIENCE.

Pursuant to notice, the members of the Entomological Club of the A. A. A. S. met at 2.30 p. m., September 3, 1884, at the Hotel Lafayette, in Philadelphia. Present: Herbert Osborn, Ames, Iowa; Dr. John G. Morris, Baltimore; Dr. G. H. Horn, Dr. Henry McCook, Eugene M. Aaron, E. T. Cresson, Philadelphia, Pa.; C. H. Fernald, Orono, Maine; Rev. G. D. Hulst, John B. Smith, E. L. Graef, Brooklyn, N. Y.; C. V. Riley, B. P. Mann, Washington; J. H. Emerton, G. Dimmock, Cambridge, Mass.; L. M. Underwood, Mr. Larkin, Syracuse, N. Y.; Dr. P. R. Hoy, Racine, Wis.; Wm. Saunders, London, Ontario; J. A. Lintner, Albany, N. Y.; Dr. Maclosky, Princeton; Dr. Harte Merriam, Locust Grove, N. Y.; H. H. Lyman, G. J. Bowles, Montreal; Prof. Martin, Messrs. Moore, Hunt, Casey, Wenzell, and others.

In the absence of the President, D. S. Kellicott, of Buffalo, N. Y., the Vice-President, Herbert Osborn, was called to the chair. A letter was read from Mr. Kellicott, regretting his inability to attend.

The election of officers was then proceeded with, and resulted as follows:—

President.....	Dr. John G. Morris.
Vice-President..	Herbert Osborn.
Secretary.....	John B. Smith.

Dr. G. H. Horn made some remarks on the historic associations connected with the spot where the present meeting was held. Many years ago when this site was far out of the City of Philadelphia, the Museum of

Natural History was there erected, and in the corner occupied by Parlor C of the hotel, stood the skeletons of a horse, ox or other large mammal. Here Thomas Say, poor in pocket, though rich in brain, having no other place to go, put up his bed under these skeletons, and that for many months was his only home; there also he contracted the illness which eventually caused his death.

The Secretary then read a short paper by D. S. Kellicott, as follows:

A NOTE: OVIPOSITING APPARATUS OF NONAGRIA SUBCARNEA.

At the Minneapolis meeting of this Club, I read a note on the life history of this species, the substance of which, together with a brief description of the moth, has since appeared in the *American Naturalist*. Since then I have ascertained how the eggs are placed and protected through the winter, and have examined somewhat the structure of the egg-placing apparatus. I have submitted an account of this moth to the Publication Committee of the Buffalo Society of Natural Sciences, from which I am permitted to extract the following remarks. I enclose also a tin-type of the drawings accompanying the paper mentioned, together with a fragment of a *Typha* leaf with the edges rolled over rows of eggs.

Figure 2 represents the ovipositing apparatus as seen from one side and below. Explanation is scarcely necessary. The last two abdominal joints are strangely modified, constituting a complex apparatus. The last joint is laterally broad, chitinous, except at base, terminating in two finger-like processes (*c*); these are rounded at the apices and curved downwards as represented in the drawing; at *b* are two concave discs with a deep groove (*g*) leading up to the anal orifice; it is evidently along this channel that the eggs are passed by the ovipositor; on either side and below the groove there is a strong chitinous ridge with saw-like teeth pointed backward (*e*). The other modified ring consists of a heavy hard band (*a*) with stout posterior processes for muscular attachment; below are two stout chisels (*d*) pointing backward and overlapping the first basal teeth of the "saws" of the last ring.

I have not succeeded in witnessing the act of oviposition. Numerous females were kept in an abandoned aquarium with *Typha* leaves, and the same watched faithfully; it was approached by day and by night, but all were concealed and quiet whenever observed. Day by day I could find additions to the stock of eggs, but the manner of performing the delicate operation of folding over and cementing down the leaf edge, forming a

secure tube for the eggs, I was not permitted to see. The eggs laid in September remained unhatched in the tubes until spring.

Fig. 3 of the tin-type represents the remarkable frontal "spine" of the moth, by means of which it rips open the pupa cell in the stem of the *Typha* and escapes. Fig. 4 represents the same of *N. typha*, and fig. 5 that of *N. subflava*. That of the last is hardly bilobed; under an inch objective, however, the apical notch appears. Only one examined.

The tin-type showing the structural details was examined by the members.

Mr. J. B. Smith said that the clypeal modification referred to was not peculiar to this species, but was shared by all others of the same genus. Clypeal modifications were very common throughout the Noctuidæ; indeed almost universal in species living in the stems of plants where the insect had obstructions to overcome in emerging from the pupa.

Mr. Smith exhibited six large photographic plates of *Agrotis*, illustrating a large number of species, and made some remarks on the great structural variability of the group *Agrotis*. Fully 26 groups based mostly on structural characters were indicated. Spinulation of tibiae, structure of front, vestiture, form of wings, antennal structure and general habitus, all are variable, and so gradual are the gradations that generic types can not be well founded on them. The plates were examined by the members, and it was agreed that they were fine specimens of the photographer's art as applied to this branch.

Dr. Morris asked whether the tendency had not been of late to an unnecessary increase of genera in all orders.

Mr. Smith said that as to the Noctuidæ undoubtedly genera were based upon apparently insufficient characters, but less so than in Coleoptera.

Dr. Horn said it was a principle long since laid down by Lacordaire that characters scarcely of specific value in one group formed excellent bases of even higher divisions in others; in his view genera are established for convenience merely and have no existence in nature. Nature has only species, and genera were simply useful in dividing the mass of species to facilitate recognition. However, of late, as new material was becoming more scarce, persons seized with the *mihi* itch were taking to describing genera; for some 12,000 species of N. A. Coleoptera, fully 2,000 genera were described.

Dr. McCook said that in ants and spiders there is plenty of opportunity for persons afflicted with that itch, as there was a very large un-

worked field there, and plenty of new forms. About 200 species (American) are thus far described. Of spiders a somewhat larger number.

Mr. Emerton said there were some 400 described species, and that naturalists generally had no idea what a very great variety of spiders really existed.

Mr. Mann read a letter from O. S. Westcott, of Maywood, Ill., suggesting the formation of a stock company for the purpose of publishing an American entomological journal, and after a lengthy discussion the question was referred to a special committee consisting of Messrs. Mann, Osborn, Horn, Aaron and Smith.

Prof. Fernald presented an invitation from the Agassiz Association, received by him, inviting the members to be present at a lecture by Dr. McCook, in Franklin Institute this evening. This invitation was accepted by the Club.

Prof. Fernald then asked for the opinions of the members on the following points :—

1. Where a name has once been published by an author, shall we change the mode of spelling to one more consistent with the derivation? e. g., Treitschke, Schmet. viii., established the genus *Cochylis*. Shall we adopt his spelling, or the more correct *Conchylis*?

Dr. Horn said he would not change it; that generic names are mere aggregations of letters representing a living thing, and that at least one well known entomologist habitually formed generic names by coining words without any meaning whatever, merely with a Grecian sound, and generally euphonious. If such names were accepted, so should misspelled names be. Some purists would make every name correspond with its origin, and it had been proposed to change the well known and universally accepted term, *Bembidium*, into *Bembicidium*; this was displaying learning without adding to knowledge.

Mr. Mann agreed with Dr. Horn. Dr. McCook thought a manifest error might be corrected, but would not make the correction if thereby an author's right of priority were destroyed, i. e., if the name thus changed were pre-occupied at the time it was originally proposed.

2. When an author once publishes a name which is manifestly incorrect in orthography, and in a later work corrects his own error, shall we adopt his correction? e. g., Treitschke published the genus *Pendina*, but later corrects it to *Penthina*.

Dr. Horn thought that where the derivation of a name was stated, a manifest error might be corrected by the author, but it would depend somewhat upon how general the use of the name had become; he was inclined to adhere to the name as originally written.

Mr. Mann also thought it would depend upon how much the name had entered into use. If it had not become known or used as erroneously written, and the author's correction was made in a reasonable time, it should be adopted.

3. Should the termination of the specific name be made to agree with the generic in gender? e. g., Zeller and some others write *Tortrix viridana*, *Exartema permundanum*, and *Lophoderus ministranus*. Shall this rule be adopted, or shall we adopt the ending *ana* irrespective of the gender of the genus?

Dr. Horn said that in Coleoptera the rule was that specific and generic names should agree in gender, and he thought the rule should be universal. Where, however, a termination had some special signification, where it indicated the group to which the species belonged, there, if it had come into general usage, he would favor uniform terminations.

Mr. Mann did not believe in uniform terminations.

4. When a Tortricid species is described with a name not ending in *ana*, should this be changed to *ana*? e. g., *Carpocapsa pomonella* Linn. Prof. Fernald himself was opposed to such a change. Dr. Morris suggested that Linne's names be left as he made them.

5. To what extent should the law of priority be made use of? Shall we make use of the oldest name, even if the species has been known under another for a long time? If not, for how long a time must a name universally or generally be in use to take precedence over an older name?

The sentiment of the meeting was strongly expressed that so much discussion without agreement had been hitherto had on that question, that no universally accepted conclusion could be reached.

6. What should be taken as the starting point in nomenclature? Some have taken the 12th Ed. of Linne's Syst. Nat., while others have taken the 10th Edition.

Dr. McCook thought the rules heretofore adopted by the British Association covered that point in favor of the 12th Edition.

Prof. Fernald replied that many of the subscribers to that rule had now changed their opinions on that point, and had taken the 10th Edition as a starting point.

Mr. Smith said, the Noctuidæ alone considered, it made no practical difference which edition was used, and so far as Tortricidæ were concerned, he did not think that any practical difficulty would arise, whichever edition was used.

Prof. Fernald expressed surprise that so much discussion should have arisen over Hübner's works, and that his names should have been so universally rejected, while Gueneé's names in the *Index methodicus*, unaccompanied by a word of description, were recognised and used without question. Hübner at least gave some sort of definition to his divisions, genera or *coiti*, so called.

Dr. Horn suggested that there might be some analogy to the cases of Erichson and Motschulsky; both of these had created some genera, not, or incompletely described, but while Erichson's genera had been universally adopted, those of Motschulsky had been as universally discarded. The reason was, Erichson's genera usually meant something and had some solid foundation, and he himself had credited to Erichson some genera first described by him (Dr. Horn) under the names proposed by Erichson. Motschulsky's genera, on the contrary, were based upon the flimsiest characters as a rule, and had no value whatever.

Mr. Smith said that as to the Noctuidæ at least, the parallel would hold. Hübner's genera were very largely devoid of all foundation, while Gueneé, as a rule, made pretty good genera and mostly described them.

Prof. Fernald thought this not true of the Tortricidæ; that quite as many names of Gueneé were baseless as of those proposed by Hübner.

Mr. J. H. Emerton announced that the types of a large number of the species described by him in his work on the "New England Spiders of the Family Therididæ," and all the types of a paper now in press, were at the Academy of Natural Sciences, and he would be happy to exhibit them to any who would make an appointment with him for that purpose.

On motion, the meeting was adjourned until 2.30 p. m., Sept. 4th, to meet then at the Entomological Rooms in the Academy of Natural Sciences, the use of this room having been offered by Messrs. Horn and Aaron on behalf of the A. E. S.

Pursuant to adjournment, the Club met at the rooms of the Am. Ent. Soc. at 2.30 p. m., Sept. 4th, Dr. Morris in the chair. The minutes of the previous meeting were read and adopted.

The committee appointed at the last meeting reported that they did

not consider that the scheme proposed by Mr. Westcott for the publication of an entomological periodical, a practicable one for the Club to undertake.

Mr. Smith gave an account of the secondary sexual characters of the Noctuidæ, illustrated by blackboard sketches; showing peculiarities of leg structure in the male butterflies and some analogous variations in the Deltoids, in which latter group the tibiæ often become aborted, while the first tarsal joint is often so abnormally developed that it is usually mistaken for the tibia. The peculiar brushes of the fore legs were noticed and some modifications commented on. The abnormal development of the last tarsal joint of *Palthis* was illustrated, as was also the peculiar palpal structure of the ♂ of that genus; so of antennæ, the peculiar bends and tuftings of the ♂, especially of the group *Herminiinae*, were noted, as were the more usual pectinations. In conclusion, Mr. Smith mentioned the varying practice of systematists as to what generic value these characters should have. In some instances these male characters were wanting, while in all other respects the species agreed with others in which all these peculiar structures were well developed; on the contrary, occasionally a species would be found which offered some peculiar character in the ♂ not usually found in its near allies, instancing *H. paradoxus*, in which the ♂ has a pellucid impression in the fore wing, around which the venation is somewhat modified. What shall we do with such a species? The ♀ well fits into *Heliothis*. Shall the ♂ then authorize a genus where the ♀ offers no basis for it? Students of other groups should give their experiences.

Prof. Fernald said that in the Tortricids, generic, and even higher value, had been given to these characters. The costal fold was a prominent ♂ character, abnormally developed in many exotic forms. In a South India form it extends fully two-thirds across the wings, while in other Indian and Japanese species it is very wide, but not so abnormally developed. Families have been based upon these characters, and one genus has been based upon a character peculiar to the ♀ only. This genus he thought would have to be abandoned.

Dr. Horn said that in systematic work and in characterizing a species both sexes should be considered. It requires two individuals, a ♂ and a ♀, to make a single complete example of a species, and classification should consider these individuals together in assigning positions to them.

Synoptic work has a higher purpose than a mere aid to a recognition of species.

Prof. Fernald was interested in Dr. Horn's view of the case ; he had been interested in the view that nature had no genera, but species only. For his part he thought he would be satisfied if he had a good definition of a species.

Dr. Maclosky said that birds sometimes offer remarkable differences in sex, and species can be distinguished only by a reference to both. The flickers, for instance, of the two sides of the continent were very distinct, but in some intermediate localities the species approached so closely that it was difficult, if not impossible, to distinguish the females, while the males were separable. There was no anatomical difference between the species, but he thought there must be physiological characters not yet discovered which separated them.

Dr. Morris thought it a curious classification that would place male and female in different genera if separately considered.

Mr. Osborn read a paper on *Mallophaga* and *Pediculide* of N. A., illustrated by drawings of specimens and slides containing specimens mounted for microscopic examination. (This paper will appear separately in the C. E.)

Miss Cora H. Clarke exhibited a specimen of the work of some Caddis Fly larvæ (*Hydropsyche*), consisting of an aggregation of mud cells on a small stone, beyond which were the nets spread by the larvæ. They were always found in running water, and always had an opening toward the current, probably to enable the larva to catch the food coming down the current. In reply to a question from Dr. Morris, Miss Clarke said the nets were often solitary, but not unfrequently aggregations were found. Another species, of *Plectrochemia*, builds a vertical tube of mud, sometimes with a number of branches ; a specimen was exhibited. Dr. Hagen thinks it an undescribed form. Reference was made to figures in a paper entitled "Description of two interesting houses made by Caddis Fly Larvæ, by Cora H. Clarke." The larvæ living in running water were difficult to raise.

Mr. Mann remarked that *apropos* of raising larvæ living in running water, Prof. Barnard, of the Dept. of Agriculture, had contrived an arrangement with which he had great success with larvæ of that kind. It consists of a glass tube, the bottom closed by a porous cloth, the other

end fastened to a faucet ; the water could be thus kept steadily flowing with any desired rapidity.

Dr. Morris exhibited a gall recently collected, the inclosed larva not bred, and asked for information as to the probable producer.

Mr. Mann said the subject of galls had puzzled him in his bibliographical work, especially as to the proper method of indexing them. He had referred to them under the head of systematic botany, but doubted his correctness.

Dr. Morris asked what orders of insects contained gall producers. Mr. Osborn thought about all orders except Neuroptera and Orthoptera. Mr. Smith said that at least one American species of *Apion* is known as a true gall producer, and in Europe several species are known to produce root galls. Mr. Osborn said that many plants, especially the *Rosacea*, were much subject to galls, while others were rarely if ever so infested. He thought them abnormal products so far as plants are concerned, and as rather belonging to insect economy since they are caused by insects ; not only that, but insects were often most readily distinguished by the form of the galls, and in the case of mites those of the maple and ash were much alike, but produced very easily distinguishable galls.

Dr. Hoy thought the galls were pathological appearances, and were rather diseases of plants and should be classed as such. In descriptive botany they had no place, any more than in a description of the lips cancer should be treated of.

Mr. Mann stated he had also indexed them under pathological botany and under insects, but the chief difficulty had arisen through a descriptive paper treating galls from a botanical standpoint.

Dr. Morris said that he had seldom seen such a dearth of larvæ of all kinds, and butterflies were exceedingly scarce.

Mr. Saunders thought there had been no unusual want of insects in Canada. *Turnus* has been common, and so was *cardui* ; the latter, indeed, had been extremely abundant in Manitoba, where it had destroyed large quantities of thistles, and caused great alarm on the part of farmers, who thought it would also attack their crops. *Thecla nippon*, usually rather a rare form, was found in some abundance this season, and in the early part of May quite a number of specimens were captured.

Dr. Hoy said that as compared with previous seasons, *cardui* has appeared in immense numbers, fifty for one. It had never previously to his knowledge attacked the hollyhock or sunflower. This season it has

litterally stripped the leaves from these plants, preferring them apparently to thistles. Other butterflies had been scarce.

Prof. Osborn said in Iowa butterflies had been unusually common.

Mr. Underwood said he had found butterflies unusually common in Central N. Y., *turnus* especially, but for five weeks spent in Conn. everything was scarce excepting *cardui*.

Prof. Fernald said in the first part of the season insects were very rare. Butterflies alone appeared about as common as usual, *turnus* unusually common; *cardui* had been rare until this summer, when it was common. Last season Mrs. Fernald had collected both at sugar and at flowers cultivated because of their attraction to insects, and flowers had proved most productive; this season the reverse has been the case.

Mr. Mann, referring to a remark made that cold winters were favorable to insect life, said that seemed to be the generally accepted theory now, and appeared borne out by facts.

Mr. Aaron said that everywhere insects are reported as exceedingly scarce. His brother from Texas so writes; from Florida, Arizona and California come the same complaints. The remarks on the abundance of *cardui* reminded him of a saying of Mr. Ridings that he was always afraid of a season in which *cardui* was common, for then nothing else would be found.

Mr. Smith said he believed cold winters favorable to insect life, but this year there was not only a cold winter, but there were several very severe frosts late in spring, one as late as June 14th-15th; it was rather these late frosts that were to be blamed for the dearth of insect life. On Cape Cod insects were unusually rare; in Vermont, where hundreds of good insects were last year taken at sugar, scarcely one fourth the number of common forms were this year found.

Dr. Hoy said that in his vicinity, far north as it is, he has taken many insects usually considered southern—more than were taken on the east of the lake. There seems to be a northern extension of the thermal line on the west of the lakes. Last season he found four specimens of the black variety of *turnus*; before only a single specimen had been found.

Mr. Saunders had never known this black variety to occur in Canada.

Dr. Merriam had found *turnus* in the central Adirondack region nearly as far north as Racine, three to four thousand feet above the sea. There were often hundreds at puddles, and among them many of this black variety.

Prof. Fernald reported the capture in Maine of a suffused form, partially yellow and part black.

Dr. Hoy asked whether all the food plants of *P. ajax* were known. He has found perfectly fresh specimens, and no pawpaw within 200 miles of the place. The butterfly is often common, but he has never found the food plant of the larva.

Mr. Larkin had noticed at his station south of Syracuse that insects were unusually scarce. The potato beetle even was very rare—not found at all in some fields. He had noticed that when they have winters that kill wheat, then usually the apple crop is good and there are few insects.

Mr. Aaron said in reply to Dr. Hoy's query, that *ajax* would feed on either spice-wood or upland huckleberry, as well as pawpaw.

Dr. Hoy said they had the huckleberry, not the spice-wood.

Mr. Osborn said he had seen *ajax* in Iowa where they had neither pawpaw nor the huckleberry, and he thought no spice-wood. He also reported a statement from Sioux City that there, *Chrysochus auratus* was so common that they were crushed under foot on the streets. Was not this unusual?

Mr. Mann said in the woods he had seen them piled in great heaps upon the stones.

(To be Continued.)

NEW CATALOGUE OF BUTTERFLIES.

We are glad to learn that a new edition of the Catalogue of the Diurnal Lepidoptera of America north of Mexico, by Wm. H. Edwards, is now in press and will shortly be issued. Since the last edition was published in 1877, a large number of new species have been described, and much information gained with regard to the geographical distribution of our butterflies. A work so much needed, prepared by so competent an authority, will be of great value to all who are interested in this department of Entomology.

CORRESPONDENCE.

Dear Sir: Mr. Lyman's objection to my statement of the size of *angulifera* is quite correct. No one could tell by it whether it was one inch or five in expanse of wing, and is only excusable from the nature of the communication, which was not a description of the insect, but only

the announcement of its having been found in Canada. I had the pleasure of several calls from Mr. Angus whilst he was on a visit to relatives in this neighborhood the latter part of the summer. The June No. of the ENTOMOLOGIST having just appeared, I gave it him to read. He said he had noticed in looking over my collection that the specimens of *angulifera* he had sent me were small in size and light in color; that they were bred specimens, which would account for that fact, and that he had full-sized insects in his collection. So that I presume that in nature *angulifera* will correspond in size with *promethea*, which is itself a rather variable insect, I having specimens ranging from $2\frac{3}{4}$ inches to $4\frac{1}{2}$ in expanse; the Ridgeway specimen of *angulifera* being $4\frac{1}{4}$, whilst one of the N. Y. specimens is only $3\frac{1}{2}$. I may mention that Mr. Angus said the caterpillar fed on the White-wood.

J. ALSTON MOFFAT.

Dear Sir: I enclose a few lines from a letter received from Miss Annie M. Wittfeld, of Indian River, Fla., written 23rd Sept. last, showing one of the trials a lepidopterist is sometimes subject to.

Coalburgh, W. Va., Oct. 1, 1884.

W. H. EDWARDS.

"Yesterday about day-break the weather was clear; about twenty minutes later a small black cloud arose in the south-east, and came along very fast, although with us there was a dead calm. We took little notice of it, till all of a sudden a terrible flash of lightning came down, followed instantly by a fearful clap of thunder and a puff of wind that took everything with it. It all lasted but a second, and then the sky was clear and calm again. Shortly after I went to the glass where I had had six full grown caterpillars of *Limenitis Eros* feeding, and I found them all dead and stiff. At the same time all my other larvæ, which were in wooden boxes, were unhurt."

OCURRENCE OF THE BASKET-WORM IN ONTARIO.

Dear Sir: Some time ago Mr. A. H. Kilman, of Ridgeway, Ontario, paid me a visit, and brought some of his moths with him which he had collected at Ridgeway. Among them was one which I have no doubt was the imago of the basket-worm, *Thyridopteryx ephemeriformis* Haw. It was injured, and I had no example at hand for comparison. Has any one reported it from Canada, or from any place in New York north of Staten Island?

D. S. KELLICOTT, Buffalo, N. Y.

